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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/036,638

12/31/2001

Brian C. Smith

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PATENT DEPARTMENT  
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EXAMINER

PARK, JUNG H

ART UNIT

PAPER NUMBER

2661

DATE MAILED: 11/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

✓

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/036,638	SMITH, BRIAN C.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Jung Park	2661	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |                                                                                                                                  |                                                                                        |
|----------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                                      | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                             | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)            |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date ____ | 6) <input type="checkbox"/> Other: ____                                                |

**DETAILED ACTION**

***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 2-5 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 2, line 11, it is not clear if the dequeue engine receives packets from the content engine. This dequeue engine within the sequencer receives packets from the stream tracker (see drawings, 30 in figure 2) and forward the packets to the content engine (see drawings, 24 in figure 1). Therefore, "from the content engine" should be changed to --from the stream tracker--.

In claim 4, line 3, "from the content engine" also needs to be changed to --from the stream tracker--.

Appropriate correction required.

***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

4. Claims 1-5 and 18 are rejected under 35 U.S.C. 102(e) as being anticipated by Mahler et al. (U.S. 6,910,134, "Mahler").

Regarding claim 1, Mahler discloses, "a system for classifying packets based on packet content, the system comprising:

- a sequencer (processor 104 in figure 2) operable to receive packets (from 102 in figure 2; col. 5, lines 11-12) and to identify packet flows (col. 5, lines 13-14);

- a content engine (processor 110 in figure 2) interfaced with the sequencer to receive packets (from 104 in figure 2) and to search packet contents (col. 7, line 12) for predetermined expressions (col. 7, line 13 where known signatures) in a packet or in a packet flow; and

- a tag map interfaced with the content engine and operable to tag packets (116 in figure 2; col. 6, lines 3-18 where it is required to tag packets to assign to one of its quality of service queues; As an example, the method of tagging packets for virus infected data is described in col. 10, lines 43-63) according to the predetermined expressions found by the content engine."

Regarding claims 2 and 18, Mahler discloses, "the sequencer comprises: an enqueue engine (memory 106 in figure 2) operable to read packet flow sequencing information (col. 4, lines 48-50); a packet flow tracker (flow management processor 122 in figure 2) interfaced with the enqueue engine and operable to track packet flows (col. 7, lines 2-3) with the sequencing information; and a dequeue engine (memory 106 in figure 2) interfaced with the packet flow tracker and the content engine, the dequeue engine forwarding packets to the content engine (from 104 to 110 in figure 2) according to sequencing information received from the packet flow tracker.

Regarding claim 3, Mahler discloses, "the enqueue engine is further operable to determine that a packet is out of order for that packet's flow (col. 4, lines 54-56) and to transmit the out-of-order packet to have any missing packets resent (*transmit missing or odd packets to processor 124 in figure 2 for further processing as described in col. 7, lines 4-5*)."

Regarding claims 4 and 5, Mahler discloses, "the dequeue engine forwards the next packet of the flow (col. 7, lines 58-65 where the content processor receives the next packet from the dequeue engine because it can process one packet or traffic flow with session id) for the sequencing information received from the packet flow tracker."

**Claim Rejections - 35 USC § 103**

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 6, 8-17 and 22-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mahler in view of Fritchman (U.S. 6,785,677, "Fritchman").

Regarding claim 6, Mahler lacks what Fritchman discloses, "the content engine comprises: a non-deterministic finite automata engine (col. 1, lines 54-57) operable to search packet content for one or more regular expressions; and one or more hash

engines (*col. 2, lines 54-65*) operable to search packet content for one or more subexpressions."

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention was made to include the non-deterministic finite automata (NFA) engine and the hash engine to the content engine taught by Mahler. The motivation of including the NFA is to read a string of symbols from its regular language such like alphabet. The motivation of including the hash engine is designed to efficiently store non-contiguous key (account number, part number, etc.) that may wide gaps in their alphabet and numeric sequences.

Regarding claim 11, it is claim corresponding to claims 1 and 6 and is therefore rejected for the similar reasons set forth in the rejection of claims 1 and 6.

Regarding claim 22, it is claim corresponding to claims 1, 6 and 7 and is therefore rejected for the similar reasons set forth in the rejection of claims 1, 6 and 7.

Regarding claims 8, 16 and 24, Mahler discloses, "the non-deterministic finite automata engine comprises field programmable gate arrays (FPGA) (*col. 11, lines 38-39 where the fast pattern processor uses FPGA, which is a programmable processor*)."

Regarding claim 9, Mahler discloses, "a state store module interfaced with the non-deterministic finite engine and operable to save the state of the non-deterministic finite automata engine associated with a packet flow so that the saved state is available for the search of the next packet of the packet flow." The detailed procedure for dealing

with the state information such as storing, updating and searching for the next packets associating with the particular traffic flow is described in column 8:65-column 9:15.

Regarding claim 10, Mahler discloses, "the content engine further comprising a tag map interfaced with the content engine to map the packet to a tag based on the content search (116 in figure 2; col. 6, lines 3-18 where it is required to tag packets to assign to one of its quality of service queues; As an example, the method of tagging packets for virus infected data is described in col. 10, lines 43-63)."

Regarding claim 12, Mahler discloses, "the packet flow comprises a TCP stream (IP networks 10 & 12 where TCP protocol is used in the IP network)."

Regarding claim 13, it is claim corresponding to claims 2-5 and is therefore rejected for the similar reasons set forth in the rejection of claims 2-5.

Regarding claim 14, it is claim corresponding to claim 6 and is therefore rejected for the similar reasons set forth in the rejection of claim 6.

Regarding claim 15, Mahler lacks what Fritchman discloses, "computing a hash for a subexpression of a regular expression match; and finding a subexpression match if the computed hash matches a hash in a hash look-up table (col. 2, lines 54-65)."

Therefore, it would have been obvious to one of ordinary skill in the art at the time of applicant's invention to include the function of computing a hash taught by Fritchman into the content engine of Mahler. The motivation of including the hash

computing function is to aid classification of packets with subexpressions by computing a hash based on subexpression matches for predetermined strings.

Regarding claims 17 and 25-28, they are claims about the procedure of dealing with state information corresponding to claim 9 and are therefore rejected for the similar reasons set forth in the rejection of claim 9.

Regarding claim 23, Mahler discloses the hash look-up table comprising bit engine that indexes the hash according to the position of bits in col. 8, lines 27-38.

7. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mahler in view of Fritchman and further in view of Imai et al. (U.S. 6,367,076, "Imai").

Regarding claim 7, Mahler and Fritchman are silent on the content engine further comprising a lexical analyzer interfaced with the non-deterministic finite automata engine and the hash engine, the lexical analyzer determining characters of the packets. However, Imai teaches the lexical analyzer determining characters of the packets (*lexical analyzer 31 in figure 1; col. 6, lines 53-54*).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention was made to include a lexical analyzer taught by Imai into the content engine disclosed by Mahler and Fritchman for the process of taking an input string of character and producing a sequence of symbols called lexical tokens in the content processor. The motivation of including the lexical analyzer is to read through the input one character at a time, changing states based on what character it encounters.



8. Claims 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mahler in view of Woo et al. (U.S. 6,850,490, "Woo").

Regarding claim 19, Mahler is silent on the procedure performed by enqueue engine. However, Woo teaches the procedure performed by enqueue engine (*enqueue engine 313 in figure 3B*) in details as described in col. 9, lines 36-63.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of applicant's invention to include the enqueue procedure taught by Woo into the content engine disclosed by Mahler. The motivation of including an enqueue procedure is to determine the packets' stream identification for the stream tracker to maintain an ordered list of packet identifications for each stream.

Regarding claims 20 and 21, Mahler fails to teach the procedure performed by dequeue engine. However, Woo teaches the procedure performed by dequeue engine (*dequeue system 340 in figure 3B*) as shown the flow chart in the figure 6.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of applicant's invention to include the dequeue procedure taught by Woo into the content engine disclosed by Mahler. The motivation of including a dequeue procedure is to forward packets to the content engine in sequence so that packet contents are searched for classification.

### **Conclusion**

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jung Park whose telephone number is 571-272-8565. The examiner can normally be reached on Mon-Fri during 7:10-4:40.


Art Unit: 2661

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chau Nguyen can be reached on 571-272-3126. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JP

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Art Unit 2661  
October 27, 2005

  
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